

1           **Forest Practice Committee Cumulative Impacts Assessment Discussion**

2                                   **November 2, 2016**

3  
4           **912.9, 932.9, 952.9 Cumulative Impacts Assessment Checklist [All Districts]**

5  
6                           **STATE OF CALIFORNIA BOARD OF FORESTRY AND FIRE PROTECTION**

7                                   **CUMULATIVE IMPACTS ASSESSMENT**

8           (1) Do the assessment area(s) of resources that may be affected by the proposed  
9 project contain any ~~past~~ Past Projects, present projects, or Reasonably Foreseeable  
10 Probably Future Projects ~~reasonably foreseeable probable future projects~~? Yes \_\_\_\_  
11 No \_\_\_\_

12 If the answer is yes, identify the project(s) and affected resource subject(s).

13           (2) Are there any continuing, significant adverse impacts from past land use  
14 activities that may add to the impacts of the proposed project? Yes \_\_\_\_ No \_\_\_\_

15 If the answer is yes, identify the activities, describing their location, impacts and affected  
16 resource subject(s).

17           (3) Will the proposed project, as presented, in combination any ~~past~~ Past Projects,  
18 present projects, and Reasonably Foreseeable Probably Future Projects ~~reasonably~~  
19 ~~foreseeable probable future projects~~ identified in items (1) and (2) above, have a  
20 reasonable potential to cause or add to significant cumulative impacts in any of the  
21 following resource subjects?

	Yes after mitigation (a)	No after mitigation (b)	No reasonably potential significant <del>effects</del> <u>impacts</u> (c)
1. Watershed			
2. Soil Productivity			
3. Biological			
4. Recreation			
5. Visual			
6. Traffic			
7. <u>Greenhouse Gases (GHG)</u>			
8. <u>Wildfire Risk and Hazard</u>			
9. <u>Other</u>			
<p>a) “Yes <u>after mitigation</u>”; means that potential significant adverse cumulative impacts are left after application of the <del>forest practice rules</del> Forest Practice Rules and mitigations or alternatives proposed by the plan submitter.</p> <p>b) “No <u>after mitigation</u>” means that any potential for the proposed timber operation to cause or add to significant adverse cumulative impacts by itself or in combination with other projects has been reduced to insignificance or avoided by mitigation measures or alternatives proposed in the <del>THP Plan</del> and application of the <del>forest practice rules</del> Forest Practice Rules.</p>			

	Yes after mitigation (a)	No after mitigation (b)	No reasonably potential significant <del>effects</del> <u>impacts</u> (c)
c) “No reasonably potential significant cumulative <del>effects</del> <u>impacts</u> ” means that the operations proposed under the <del>THP Plan</del> do not have a reasonable potential to join with the impacts of any other project to cause, add to, or constitute significant adverse cumulative impacts.			

(4) If column (a) is checked in (3) above describe why the expected impacts cannot be feasibly mitigated or avoided and what mitigation measures or alternatives were considered to reach this determination. If column (b) is checked in (3) above describe what mitigation measures have been selected which will substantially reduce or avoid reasonably potential significant cumulative impacts except for those mitigation measures or alternatives mandated by application of the ~~rules of the Board~~ rules.

(5) Provide a brief description of the assessment area used for each resource subject.

(6) List and briefly describe the individuals, organizations, and records consulted in the assessment of cumulative impacts for each resource subject. Records of the information used in the assessment shall be provided to the Director upon request.

**BOARD OF FORESTRY AND FIRE PROTECTION TECHNICAL**  
**RULE ADDENDUM NO. 2**  
**CUMULATIVE IMPACTS ASSESSMENT**

**Introduction**

The purpose of this addendum is to ~~guide~~ provide the minimum standards included by RPFs within the assessment of cumulative impacts ~~assessment~~ as required in 14 CCR §§ 898, 912.9, 932.9, 952.9 and 1034 that may occur as a result of proposed timber operations. This assessment shall include evaluation of both on-site and off-site interactions of proposed project activities with the impacts of past and reasonably foreseeable future projects.

In conducting ~~an a cumulative impacts~~ assessment, the RPF ~~must shall~~ distinguish between on-site impacts that are mitigated by application of the California Forest Practice Rules and the interactions of proposed activities (which may not be significant when considered alone) with impacts of Past Projects and Reasonably Foreseeable Probable Future Projects ~~past and reasonably foreseeable future projects pursuant to PRC § 15130(b)(1)(a).~~

Resource subjects ~~to be that shall be~~ considered in the preparation of a the ~~assessment of cumulative impacts~~ cumulative impacts assessment ~~are described in the Appendix~~ include watershed resources, soil productivity, biological resources, recreational resources, visual resources, vehicular traffic impacts, greenhouse gas impacts and wildfire.

The RPF preparing a THP Plan shall conduct an assessment based on information that is reasonably available ~~before prior to~~ submission of the ~~THP Plan~~. RPFs ~~are~~

1 ~~expected to shall~~ submit sufficient information to ~~the Director to~~ support their findings if  
2 significant issues are raised during the Department's review of the ~~THP Plan~~.

3 Information used in ~~the assessment of a~~ cumulative impacts ~~assessment~~ may be  
4 supplemented during the ~~THP Plan~~ review period. Agencies participating in ~~plan-Plan~~  
5 review may provide input into the cumulative impacts assessment based upon their area  
6 of expertise. Agencies ~~should shall support justify and support~~ their recommendations  
7 with ~~documentation~~.

**Comment [A1]:** Staff Comment: Is this sentence required give the previous sentence.

**Comment [A2]:** Staff comment: What type of documentation "relevant" "contemporary" "empirical"

8 The Department, as lead agency, shall make the final determination regarding ~~the~~  
9 ~~sufficiency of a cumulative impacts~~ assessment ~~sufficiency~~ and the presence or  
10 absence of significant ~~cumulative environmental~~ impacts. This determination shall be  
11 based on a review of all sources of information provided and developed during review of  
12 the ~~Timber Harvesting~~ Plan.

#### 14 **Identification of ~~Resource Areas~~ Geographic Assessment Areas**

15 The RPF shall establish and briefly describe the geographic assessment area within or  
16 surrounding the ~~plan-Plan~~ for each resource subject to be assessed and shall briefly  
17 explain the rationale for establishing the ~~resource geographic assessment~~ area. This shall  
18 be a narrative description and shall be shown on a map ~~where when~~ a map adds clarity to  
19 the ~~assessment~~ description of the geographic assessment area.

#### 21 **Identification of Information Sources**

22 The RPF shall list and briefly describe the individuals, organizations, and records  
23 ~~used relied upon~~ as sources of information in the ~~assessment of preparation~~ cumulative  
24 impacts ~~assessment~~, including references for listed records and the names, affiliations,  
25 addresses, and phone numbers of specific individuals contacted. Records of information

used in the preparation of a cumulative impacts assessment shall be provided to the Director upon request.

Common sources of information for cumulative ~~effects~~ impacts assessment are identified below. Sources to be used will depend upon the complexity of individual situations and the amount of information available from other plans. Sources not listed below may have to be consulted based on individual circumstances. Not all sources of information need to be consulted for every ~~THP Plan~~.

**1. Consultation with Experts and Organizations:**

- |  |  |
|--|--|
| <b>(a)</b> County Planning Department; | <b>(b)</b> Biologists;                   |
| <b>(c)</b> Geologists;                 | <b>(d)</b> Soil Scientists;              |
| <b>(e)</b> Hydrologists;               | <b>(f)</b> Federal Agencies;             |
| <b>(g)</b> State Agencies;             | <b>(h)</b> Public and private utilities. |

**2. Records Examined:**

- |  |   |
|--|---|
| <b>(a)</b> Soil Maps;  | <b>(b)</b> Geology Maps;                  |
| <b>(c)</b> Aerial Photographs;   | <b>(d)</b> Natural Diversity Data Base;   |
| <b>(e)</b> <u>THP Plan</u> Records;  | <b>(f)</b> Special Environmental Reports; |
| <b>(g)</b> <u>Topographic Maps</u> ;   | <b>(h)</b> Basin Plans;                   |
| <b>(i)</b> Fire History Maps;  |   |
| <b>(j)</b> Relevant Federal Agency Documents or Plans;                               |   |
| <b>(k)</b> <u>Relevant Watershed or Wildlife Studies (published or unpublished);</u> |   |
| <b>(l)</b> <u>Available Modeling Approaches</u>                                      |   |

As provided in ~~Section 14 CCR § 898 of the rules~~, the RPF or supervised designee and the plan submitter must consult information sources that are reasonably available.

**Past Projects and Reasonably Foreseeable Probable and Future Activities**

**Projects**

Past Projects and Reasonably Foreseeable Probable Future Projects ~~future projects~~ included in the cumulative impacts assessment shall be described as follows:

**A.** Identify and briefly describe the location of ~~past and reasonably foreseeable probable future projects~~ Past Projects and Reasonably Foreseeable Probable Future Projects as defined in 14 CCR § 895.1 within described ~~resource~~ geographic assessment areas.

Include a map or maps and associated legend(s) clearly depicting the following information:

1. Township and Range numbers and Section lines.

2. Boundary of the ~~p~~Planning ~~w~~Watershed(s) within which the plan area is located along with the CALWATER 2.2 identification number.

3. Location and boundaries of Past Projects, present projects and Reasonably Foreseeable Probable Future Projects~~past, present and reasonably foreseeable probable future timber harvesting projects~~ on land owned or controlled by the timberland owner of the proposed timber harvest within the ~~p~~Planning ~~w~~Watershed(s) depicted in section (2) above. For purposes of this section, Past Projects ~~past projects~~ shall be limited to those projects submitted within ten years prior to submission of the THP Plan.

4. Silvicultural methods for each of the timber harvesting projects depicted in section (3) above. Each specific silvicultural method must be clearly delineated on the map(s), and associated THP Plan number referenced in the legend or an annotated list. In addition, shading, hatching, or labeling shall be used which clearly differentiates silvicultural methods into one of the four categories outlined in Table 1.

5. A north arrow and scale bar (or scale text).

6. Source(s) of geographical information.

**Comment [A3]:** Strike or modify language to make congruent with 895.1.

The map scale shall be large enough to clearly represent one planning watershed per page or of a scale not less than 1:63,360. Planning watersheds with densely situated or overlapping harvest units, or those which are large or irregular in size, may require multiple maps to achieve clarity. Map(s) shall be reproducible on black & white copiers, and submitted on an 8½ x 11 page(s).



**Table 1**

<b>Silvicultural Category</b>	<b>Silvicultural Method</b>
Evenaged Management 14 CCR § 913.1 [933.1, 953.1]	Clearcutting, Seed Tree Seed Step, Seed Tree Removal Step, Shelterwood Preparatory Step, Shelterwood Seed Step, Shelterwood Removal Step
Unevenaged Management 14 CCR § 913.2 [933.2, 953.2]	Selection, Group Selection, Transition
Intermediate Treatments 14 CCR § 913.3 [933.3, 953.3]	Commercial Thinning, Sanitation-Salvage
Special Prescriptions and Other Management 14 CCR § 913.4 [933.4, 953.4]	Special Treatment Area Prescriptions, Rehabilitation of Understocked Area Prescription, Fuelbreak/Defensible Space, Southern Subdistrict Special Harvesting Method (14 CCR § 913.8), Variable Retention, Conversion
Alternative Prescriptions shall be put into the category within which the most nearly appropriate or feasible silvicultural method in the Forest Practice Rules is found pursuant to 14 CCR § 913.6 (b)(3)[933.6(b)(3), 953.6(b)(3)].	

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1 **B. The RPF shall identify-identify** and give the location and description of any known,  
2 continuing significant environmental problems-effects caused by past-Past projects  
3 Projects as defined in 14 CCR § 895.1. The RPF who prepares the plan-Plan, or their  
4 supervised designee, shall obtain information from plan submitters (timberland or timber  
5 owner), and from appropriate agencies, landowners, and individuals about past, and  
6 future land management activities and shall consider past experience, if any, in the  
7 assessment area related to past impacts and the impacts of the proposed operations,  
8 rates of recovery, and land uses. A poll of adjacent land owners is encouraged and may  
9 be required by the Director to determine such activities and significant adverse  
10 environmental problems on adjacent ownerships.

**Comment [A4]:** Staff Comment: "Geographic"  
"watershed" or other assessment area.

**Comment [A5]:** Not an enforceable standard.  
Enforceability needs to be addressed for this  
standard.

## 12 **Appendix Technical Rule Addendum # 2**

14 In evaluating cumulative impacts, the RPF shall consider the factors set forth herein.

### 15 **A. Watershed Resources**

16 Cumulative Watershed Effects (CWEs) occur within and near bodies of water or  
17 significant wet areas-wet meadows or other wet areas, where individual impacts are  
18 combined to produce an effect that is greater than any of the individual impacts acting  
19 alone. Factors to consider in the evaluation of cumulative watershed impacts are listed  
20 below.

21 **1.** Impacts to watershed resources within the Watershed Assessment Area (WAA)  
22 shall be evaluated based on significant on-site and off-site cumulative effects on beneficial  
23 uses of water, as defined and listed in applicable Water Quality Control Plans.

24 **2.** Watershed effects produced by timber harvest and other activities may include  
25 one or more of the following:

- Sediment
- Water temperature
- Organic debris
- Chemical contamination
- Peak flow

The following general guidelines shall be ~~used~~ considered when evaluating watershed impacts. The factors described are general and may not be appropriate for all situations. Actual measurements may be required if needed to evaluate significant environmental effects. The plan must comply with the quantitative or narrative water-quality objectives set forth in an applicable Water Quality Control Plan.

**a. Sediment Effects.** Sediment-induced CWEs occur when earth materials transported by surface or mass wasting erosion enter a stream or stream system at separate locations and are then combined at a downstream location to produce a change in water quality or channel condition. The eroded materials can originate from the same or different projects. Sediment is composed of both suspended and bedload material. Suspended sediment is usually the primary source of turbidity in forested watersheds, although suspended organic material also accounts for a proportion of the suspended load. Chronic turbidity can be an indicator of a cumulative watershed sediment effect when sources can be identified and linked to one or more projects. Both turbidity and suspended sediment concentrations are subject to extreme inherent variability from region to region, storm to storm, and from year to year, dependent upon underlying geology and precipitation.

Potentially adverse sediment changes are most likely to occur in the following locations and situations:

1 - Downstream areas of ~~reduced~~ low stream gradient where  
2 sediment from a new source may be deposited in addition to sediment derived from  
3 existing or other new sources.

4 - Immediately downstream from where sediment from a new  
5 source is combined with sediment from other new or existing sources and the combined  
6 amount of sediment exceeds the transport capacity of the stream.

7 - Any location where sediment from new sources in  
8 combination with suspended sediment from existing or other new sources significantly  
9 increases turbidity- reduces the survival of fish or other aquatic organisms- or otherwise  
10 reduces the quality of waters used for domestic, agricultural, or other beneficial uses.

11 - Channels with relatively steep gradients which contain  
12 accumulated sediment and debris that can be mobilized by sudden new sediment inputs,  
13 such as debris flows, resulting in debris torrents and severe channel scouring.

14 Potentially significant adverse impacts of cumulative sediment inputs  
15 may include:

16 - Increased treatment needs or reduced suitability for domestic,  
17 municipal, industrial, or agricultural water use.

18 - Direct mortality of fish and other aquatic species.

19 - Impaired spawning and rearing habitat for salmonids or  
20 otherwise - ~~Reduced~~ Reduced viability of aquatic organisms or disruption of aquatic habitats and  
21 loss of stream productivity caused by filling of pools and plugging or burying streambed  
22 gravel.

23 - Accelerated channel filling (aggradation) resulting in loss of  
24 streamside vegetation and stream migration that can cause accelerated bank erosion.

1 - Accelerated channel filling (aggradation) resulting in increased  
2 frequency and magnitude of overbank flooding.

3 - Accelerated filling of downstream reservoirs, navigable  
4 channels, water diversion and transport facilities, estuaries, and harbors.

5 - Channel scouring by debris flows and torrents.

6 - Nuisance to or reduction in water related recreational  
7 activities.

8 Situations where sediment production potential is greatest include:

9 - Sites with high or extreme erosion hazard ratings.

10 - Sites which are tractor logged on steep slopes.

11 - Unstable areas.

12 **b. Water Temperature Effect.** Water temperature related CWEs are  
13 changes in water chemistry or biological properties caused by the combination of solar  
14 warmed water from two or more locations (in contrast to an individual effect that results  
15 from impacts along a single stream segment) where natural cover has been removed.  
16 Cumulative changes in water temperature are most likely to occur in the following  
17 situations:

18 - Where stream bottom materials are dark in color.

19 - Where water is shallow and has little underflow.

20 - Where removal of streamside canopy results in substantial,  
21 additional solar exposure or increased contact with warm air at two or more locations  
22 along a stream.

23 - Where removal of streamside canopy results in substantial,  
24 additional solar exposure or increased contact with warm air at two or more streams that  
25 are tributary to a larger stream.

1 - Where water temperature is near a biological threshold for  
2 specific species.

3 Significant adverse impacts of cumulative temperature increases  
4 include:

5 - Increases in the metabolic rate of aquatic species.

6 - Direct increases in metabolic rate and/or reduction of  
7 dissolved oxygen levels, either of which can cause reduced vigor and death of sensitive  
8 fish and other sensitive aquatic organisms.

9 - Increased growth rates of microorganisms that deplete  
10 dissolved oxygen levels or increased disease potential for organisms.

11 - Stream biology shifts toward warmer water ecosystems.

12 **c. Organic Debris Effects.** CWEs produced by organic debris can  
13 occur when logs, limbs, and other organic material are introduced into a stream or lake at  
14 two or more locations. Decomposition of this debris, particularly the smaller sized and  
15 less woody material, removes dissolved oxygen from the water and can cause impacts  
16 similar to those resulting from increased water temperatures. Introduction of excessive  
17 small organic debris can also increase water acidity.

18 Large organic debris is an important stabilizing agent that should be maintained in  
19 small to medium size, steep gradient channels, but the sudden introduction of large,  
20 unstable volumes of bigger debris (such as logs, chunks, and larger limbs produced  
21 during a logging operation) can obstruct and divert streamflow against erodible banks,  
22 block fish migration, and may cause debris torrents during periods of high flow.

23 Removing streamside vegetation can reduce the natural, annual inputs of litter to the  
24 stream (after decomposition of logging-related litter). This can cause both a drop in food  
25 supply, and resultant productivity, and a change in types of food available for organisms

1 that normally dominate the lower food chain of streams with an overhanging or adjacent  
2 forest canopy.

3 **d. Chemical Contamination Effects.** Potential sources of chemical  
4 CWEs include run-off from roads treated with oil or other dust-retarding materials, direct  
5 application or run-off from pesticide treatments, contamination by equipment fuels and  
6 oils, and the introduction of nutrients released during slash burning or wildfire from two or  
7 more locations.

8 **e. Peak Flow Effects.** CWEs can be caused by management  
9 induced peak flow increases in streams during storm events, are difficult to anticipate.  
10 Peak flow increases may result from management activities that reduce rainfall  
11 interception (i.e., evaporation) and vegetative water use (i.e., transpiration), or produce  
12 openings where snow can accumulate, (such as clear-cutting in clearcuts and site  
13 preparation on roads and landings), or that change the timing of flows by producing more  
14 efficient runoff runoff (such as insloped roads). These While increases, if any,, however,  
15 are likely to be small relative to pre-harvest natural peak flows, extensive canopy removal  
16 over a short period of time on a watershed scale can increase peak flow effect on  
17 streambank erosion, channel incision, and headward channel extension in erodible  
18 landscapes. from medium and large storms. Research to date on the effects of  
19 management activities on channel conditions indicates that channel changes during storm  
20 events are primarily the result of large sediment inputs. The timing and concentration of  
21 flows affecting lower order stream channel morphology can also be affected by the routing  
22 of runoff from roads, landings, and skid trails. Peak flow effects diminish with decreasing  
23 intensity of canopy removal, increasing time since harvest, and during larger flow  
24 recurrence intervals.  
25



1                   **3. Watercourse Condition.** The watershed impacts of past upstream and

2 on-site projects are often reflected in the condition of stream channels on the project area.

3 Following is a list of channel characteristics and factors that may be used to describe

4 current watershed conditions and to assist in the evaluation of potential project impacts:

5                   ◇ Gravel Embedded - Spaces between stream gravel filled with sand  
6 or finer sediments. Gravel are often in a tightly packed arrangement.

7                   ◇ Pools Filled - Former pools or apparent pool areas filled with  
8 sediments leaving few areas of deep or "quiet" water relative to stream flow or size.

9                   ◇ Aggrading - Stream channels filled or filling with sediment that raises  
10 the channel bottom elevation. Pools will be absent or greatly diminished and gravel may  
11 be embedded or covered by finer sediments. Streamside vegetation may be partially or  
12 completely buried, and the stream may be meandering or cutting into its banks above the  
13 level of the former streambed. Depositional areas in aggrading channels are often  
14 increasing in size and number.

15                  ◇ Bank Cutting - Can either be minor or severe and is indicated by  
16 areas of fresh, unvegetated soil or alluvium exposed along the stream banks, usually  
17 above the low-flow channel and often with a vertical or undercut face. Severe bank  
18 cutting is often associated with channels that are downcutting, which can lead to over-  
19 steepened banks, or aggrading, which can cause the channel to migrate against slopes  
20 that were previously above the high flow level of the stream.

21                  ◇ Bank Mass Wasting - Channels with landslides directly entering the  
22 stream system. Slide movement may be infrequent (single events) or frequent (continuing  
23 creep or periodic events).

1                   ◇ Downcutting - Incised stream channels with relatively clean,  
2 uncluttered beds cut below the level of former streamside vegetation and with eroded,  
3 often undercut or vertical, banks.

4                   ◇ Scoured - Stream channels that have been stripped of gravel and  
5 finer bed materials by large flow events or debris torrents. Streamside vegetation has  
6 often been swept away, and the channel has a raw, eroded appearance.

7                   ◇ Organic Debris - Debris in the watercourse can have either a positive  
8 or negative impact depending on the amount and stability of the material. Some stable  
9 organic debris present in the watercourse helps to form pools and retard sediment  
10 transport and downcutting in small to medium sized streams with relatively steep  
11 gradients. Large accumulations of organic debris can block fish passage, block or divert  
12 streamflow, or could be released as a debris flow.

13                  ◇ Stream-Side Vegetation - Stream-side vegetation and near-stream  
14 vegetation provide shade or cover to the stream, which may have an impact on water  
15 temperature, and provides root systems that stabilize streambanks and floodplains and  
16 filter sediment from flood flows.

17                  ◇ Recent Floods - A recent high flow event that would be considered  
18 unusual in the project area may have an impact on the current watercourse condition.

## 19       **B. Soil Productivity**

20       Cumulative soil productivity impacts occur when the effects of two or more activities,  
21 from the same or different projects, combine to produce a significant decrease in soil  
22 biomass production potential. These impacts most often occur on-site within the project  
23 boundary, and the relative severity of productivity losses for a given level of impact  
24 generally increases as site quality declines. The primary factors influencing soil  
25 productivity that can be affected by timber operations include:

1                   ◇ Organic matter loss.

                  ◇ Soil compaction.

2                   ◇ Surface soil loss.

                  ◇ Growing space loss.

3           The following general guidelines may be used when evaluating soil productivity  
4 impacts.

5           **1. Organic Matter Loss.** Displacement or loss of organic matter can result  
6 in a long term loss of soil productivity. Soil surface litter and downed woody debris are the  
7 store-house of long term soil fertility, provide for soil moisture conservation, and support  
8 soil microorganisms that are critical in the nutrient cycling and uptake process. Much of  
9 the chemical and microbial activity of the forest nutrient cycle is concentrated in the  
10 narrow zone at the soil and litter interface.

11          Displacement of surface organic matter occurs as a result of skidding, mechanical  
12 site preparation, and other land disturbing timber operations. Actual loss of organic matter  
13 occurs as a result of burning or erosion. The effects of organic matter loss on soil  
14 productivity may be expressed in terms of the percentage displacement or loss as a result  
15 of all project activities.

16          **2. Surface Soil Loss.** The soil is the storehouse of current and future site  
17 fertility, and the majority of nutrients are held in the upper few inches of the soil profile.  
18 Topsoil displacement or loss can have an immediate effect on site productivity, although  
19 effects may not be obvious because of reduced brush competition and lack of side-by-  
20 side comparisons or until the new stand begins to fully occupy the available growing  
21 space.

22          Surface soil is primarily lost by erosion or by displacement into windrows, piles, or  
23 fills. Mass wasting is a special case of erosion with obvious extreme effects on site  
24 productivity. The impacts of surface soil loss may be evaluated by estimating the  
25 proportion of the project area affected and the depth of loss or displacement.

1                   **3. Soil Compaction.** Compaction affects site productivity through loss of

2 large soil pores that transmit air and water in the soil and by restricting root penetration.

3 The risk of compaction is associated with:

- 4                   - Depth of surface litter.                   - Soil structure.
- 5                   - Soil organic matter content.                   - Presence and amount of coarse
- 6 fragments in the soil.
- 7                   - Soil texture.                   - Soil moisture status.

8

9                   Compaction effects may be evaluated by considering the soil conditions, as listed

10 above, at the time of harvesting activities and the proportion of the project area subjected

11 to compacting forces.

12                   **4. Growing Space Loss.** Forest growing space is lost to roads, landings,

13 permanent skid trails, and other permanent or non-restored areas subjected to severe

14 disturbance and compaction.

15                   The effects of growing space loss may be evaluated by considering the overall

16 pattern of roads, etc., relative to feasible silvicultural systems and yarding methods.

17                   **C. Biological Resources**

18                   Biological assessment areas will vary with the species being evaluated and its

19 habitat. Factors to consider in the evaluation of cumulative biological impacts include:

20                   **1.** Any known rare, threatened, or endangered species or sensitive species

21 (as described in the Forest Practice Rules) that may be directly or indirectly affected by

22 project activities. Significant cumulative effects on listed species may be expected from

23 the results of activities over ~~time which combine~~ time which combines to have a

24 substantial effect on the species or on the habitat of the species.

1                   **2.** Any significant, known wildlife or fisheries resource concerns within the  
2 immediate project area and the biological assessment area (e.g. loss of oaks creating  
3 forage problems for a local deer herd, species requiring special elements, sensitive  
4 species, and significant natural areas). Significant cumulative effects may be expected  
5 where there is a substantial reduction in required habitat or the project will result in  
6 substantial interference with the movement of resident or migratory species.  
7 The significance of cumulative impacts on non-listed species viability should be  
8 determined relative to the benefits to other non-listed species. For example, the  
9 manipulation of habitat results in conditions which discourage the presence of some  
10 species while encouraging the presence of others.

11                   **3.** The aquatic and near-water habitat conditions on the ~~THP~~ Plan and immediate  
12 surrounding area. Habitat conditions of major concern are: Pools and riffles, Large  
13 woody material in the stream, Near-water vegetation. Much of the information needed to  
14 evaluate these factors is described in the preceding Watershed Resources section. A  
15 general discussion of their importance is given below:

16                   **a. Pools and Riffles.** Pools and riffles affect overall habitat quality  
17 and fish community structure. Streams with little structural complexity offer poor habitat  
18 for fish communities as a whole, even though the channel may be stable. Structural  
19 complexity is often lower in streams with low gradients, and filling of pools can reduce  
20 stream productivity.

21                   **b. Large Woody Material.** Large woody debris in the stream plays  
22 an important role in creating and maintaining habitat through the formation of pools.  
23 These pools comprise important feeding locations that provide maximum exposure to  
24 drifting food organisms in relatively quiet water. Removal of woody debris can reduce  
25 frequency and quality of pools.

1                   **c. Near-Water Vegetation.** Near-water vegetation provides many

2   habitat benefits, including: shade, nutrients, vertical diversity, migration corridors, nesting,  
3   roosting, and escape. Recruitment of large woody material is also an important element  
4   in maintaining habitat quality.

5           **4.** The biological habitat condition of the ~~THP~~ Plan and immediate surrounding  
6   area. Significant factors to consider are:

- 7                   ◇ Snags/den trees                                   ◇ Hardwood cover  
8                   ◇ Downed, large woody debris           ◇ Late seral (mature) forest characteristics.  
9                   ◇ Multistory canopy                               ◇ Late seral habitat continuity  
10                  ◇ Road density

11   The following general guidelines may be used when evaluating biological habitat. The  
12   factors described are general and may not be appropriate for all situations. The ~~THP~~ Plan  
13   preparer must also be alert to the need to consider factors which are not listed below. Each  
14   set of ground conditions are unique and the analysis conducted must reflect those  
15   conditions.

16           **a. Snags/Den/Nest Trees:** Snags, den trees, nest trees and their  
17   recruitment are required elements in the overall habitat needs of more than 160 wildlife  
18   species. Many of these species play a vital role in maintaining the overall health of  
19   timberlands. Snags of greatest value are >16" DBH and 20 ft. in height. The degree of  
20   snag recruitment over time should be considered. Den trees are partially live trees with  
21   elements of decay which provide wildlife habitat. Nest trees have importance to birds  
22   classified as a sensitive species.

23           **b. Downed large, woody debris:** Large downed logs (particularly conifers)  
24   in the upland and near-water environment in all stages of decomposition provide an  
25   important habitat for many wildlife species. Large woody debris of greatest value consists

1 of downed logs >16" diameter at the large end and >20 feet in length.

2 **c. Multistory canopy:** Upland multistoried canopies have a marked  
3 influence on the diversity and density of wildlife species utilizing the area. More  
4 productive timberland is generally of greater value and timber site capability should be  
5 considered as a factor in an assessment. The amount of upland multistoried canopy may  
6 be evaluated by estimating the percent of the stand composed of two or more tree layers  
7 on an average per acre basis.

8 Near-water multistoried canopies in riparian zones that include conifer and hardwood  
9 tree species provide an important element of structural diversity to the habitat  
10 requirements of wildlife. Near-water multistoried canopy may be evaluated by estimating  
11 the percentage of ground covered by one or more vegetative canopy strata, with more  
12 emphasis placed on shrub species along Class III and IV streams (14 CCR §§ 916.5,  
13 936.5, or 956.5).

14 **d. Road Density:** Frequently traveled permanent and secondary roads  
15 have a significant influence on wildlife use of otherwise suitable habitat. Large declines in  
16 deer and bear use of areas adjacent to open roads are frequently noted. Road density  
17 influence on large mammal habitat may be evaluated by estimating the miles of open  
18 permanent and temporary roads, on a per-section basis, that receive some level of  
19 maintenance and are open to the public. This assessment should also account for the  
20 effects of vegetation screening and the relative importance of an area to wildlife on a  
21 seasonal basis (e.g. winter range).

22 **e. Hardwood Cover:** Hardwoods provide an important element of habitat  
23 diversity in the coniferous forest and are utilized as a source of food and/or cover by a  
24 large proportion of the state's bird and mammal species. Productivity of deer and other  
25 species has been directly related to mast crops. Hardwood cover can be estimated using

the basal area per acre provided by hardwoods of all species.

**[Northern and Southern only]:** Post-harvest deciduous oak retention for the maintenance of habitats for mule deer and other hardwood-associated wildlife shall be guided by the Joint Policy on Hardwoods between the California Board of Forestry and California Fish and Game Commission (5/9/94). To sustain wildlife, a diversity of stand structural and seral conditions, and tree size and age classes of deciduous oaks should be retained in proportions that are ecologically sustainable. Regeneration and recruitment of young deciduous oaks should be sufficient over time to replace mortality of older trees. Deciduous oaks should be present in sufficient quality and quantity, and in appropriate locations to provide functional habitat elements for hardwood-associated wildlife.

**f. Late Seral (Mature) Forest Characteristics:**

Determination of the presence or absence of mature and over-mature forest stands and their structural ~~characteristics provides characteristics provide~~ a basis from which to begin an assessment of the influence of management on associated wildlife. These characteristics include large trees as part of a multilayered canopy, large decadent trees and the presence of a large numbers of snags and downed logs, ~~all of which that~~ contribute to an increased level of stand decadence and complexity. Late seral stage forest amount may be evaluated by estimating the percentage of the land base within the project and the biological assessment area occupied by areas conforming to the following definitions:

Forests not previously harvested should be at least 80 acres in size to maintain the effects of edge. This acreage is variable based on the degree of similarity in surrounding areas. The area should include a multi-layered canopy, two or more tree species with several large coniferous trees per acre (smaller subdominant trees may be either conifers



or hardwoods), large conifer snags, and an abundance of large woody debris.

Previously harvested forests are in many possible stages of succession and may include remnant patches of late seral stage which generally conform to the definition of unharvested forests but do not meet the acreage criteria.

**g. Late Seral Habitat Continuity:** Projects containing areas meeting the definitions for late seral stage characteristics must be evaluated for late seral habitat continuity. The fragmentation and resultant isolation of late seral habitat types is one of the most significant factors influencing the sustainability of wildlife populations not adapted to edge environments.

This fragmentation may be evaluated by estimating the amount of the on-site number of acres within both the project area, and as well as the biological assessment area occupied by portions of or entire late seral stands greater than at least 80 acres in size (considering the mitigating influence of adjacent and similar habitat, if applicable) and less than one mile apart or connected by a corridor of similar habitat.

**h. Special Habitat Elements:** The loss of a key habitat element may have a profound effect on a species even though the habitat is otherwise suitable. Each species may have several key limiting factors to consider. For example, a special need for some large raptors is large decadent trees/snags with broken tops or other features. Deer may have habitat with adequate food and cover to support a healthy population size and composition but dependent on a few critical meadows suitable for fawning success. These and other key elements may need special protection.

#### **D. Recreational Resources ~~RECREATIONAL RESOURCES~~**

The recreational assessment area is generally the area that includes the logging area plus 300 feet.

To assess recreational cumulative impacts:

1                   1. Identify the recreational activities involving significant numbers of people  
2 in and within 300 ft. of logging area (e.g., fishing, hunting, hiking, picnicking, camping).

3                   2. Identify any recreational Special Treatment Areas described in the Board rules  
4 on the plan area or contiguous to the area.

5                   **E. Visual Resources ~~VISUAL RESOURCES~~**

6                   The visual assessment area is generally the logging area that is readily visible to  
7 significant numbers of people who are no further than three miles from the timber  
8 operation. To assess visual cumulative effects:

9                   1. Identify any Special Treatment Areas designated as such by the Board  
10 because of their visual values.

11                   2. Determine how far the proposed timber operation is from the nearest  
12 point that significant numbers of people can view the timber operation. At distances of  
13 greater than 3 miles from viewing points activities are not easily discernible and will be  
14 less significant.

15                   3. Identify the manner in which the public identified in 1 and 2 above will  
16 view the proposed timber operation (from a vehicle on a public road, from a stationary  
17 public viewing point or from a pedestrian pathway).

18  
19                   **F. Vehicular Traffic Impacts ~~VEHICULAR TRAFFIC IMPACTS:~~**

20                   The traffic assessment area involves the first roads not part of the logging area on which  
21 logging traffic must travel. To assess traffic cumulative effects:

22                   1. Identify whether any publicly owned roads will be used for the transport  
23 of wood products.

24                   2. Identify any public roads that have not been used recently for the  
25 transport of wood products and will be used to transport wood products from the

proposed timber harvest.

3. Identify any public roads that have existing traffic or maintenance problems.

4. Identify how the logging vehicles used in the timber operation will change the amount of traffic on public roads, especially during heavy traffic conditions.

#### **G. Greenhouse Gas (GHG) Impacts**

Forest management effects sequestration and emission rates of forests to the extent management activities affect forest inventory, growth, yield, and mortality. Timber operations and subsequent production of wood products can result in both the emission and storage of GHGs.

Any one or a combination of the following options can be used to assess the potential for significant cumulative GHG effects:

1. Incorporation by reference, or tiering from, a programmatic assessment that was certified by the Board, CAL FIRE, or other State Agency, which analyzes the net effects of GHG associated with forest management activities.
2. Application of a model or methodology quantifying an estimate of greenhouse gas emissions resulting from the project. The model or methodology should at minimum consider the following:
  - a. Inventory, growth, and harvest over a specified planning horizon
  - b. Projected forest sequestration over the planning horizon
  - c. Timber operation related emissions originating from logging equipment and

1 transportation of logs to manufacturing facility

2 d. GHG emissions and storage associated with the production and life cycle of  
3 manufactured wood products

4  
5 3. A qualitative analysis describing the extent to which the project in combination with  
6 Past Project and Reasonably Foreseeable Probable Future Projects may increase  
7 or reduce GHG emissions compared to the existing environmental setting. Such  
8 analysis should disclose if a known threshold of significance for the project type  
9 has been identified by the Board, CAL FIRE or State Agency, and if so, if the  
10 project's emissions in combination with other forestry projects are anticipated to  
11 exceed this threshold.

#### 12 13 **H. Wildfire**

14 Modifications to fuel loading through timber harvest activities may affect wildfire risk, hazard  
15 and behavior. The alteration of these aspects of wildfire may negatively or positively affect  
16 communities and/or infrastructure within proximity to the proposed project, particularly in the  
17 wildland urban interface.

18  
19 Factors to consider that affect wildfire risk, hazard, and behavior include:

- 20
- |  |   |
|--|---|
| ◇ <u>Fire hazard severity rating</u>       | ◇ <u>Post-harvest logging area fuel</u> |
|  | <u>loading conditions</u>               |
| ◇ <u>Topography</u>                        | ◇ <u>Public/private roads</u>           |
| ◇ <u>Residential/commercial structures</u> | ◇ <u>Historic monuments</u>             |
| ◇ <u>Local/state/federal parks</u>         | ◇ <u>Domestic water sources</u>         |

◇ Schools and hospitals

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